



2025 INPS Native Plant of the Year: Jack-in-the-Pulpit

By Michael Homoya

With over 400 votes cast, INPS members recently selected Jack-in-the-pulpit (*Arisaema triphyllum*) as their 2025 Native Plant of the Year.

Jack-in-the-pulpit is a common spring-flowering plant of Indiana's moist forests. Being an aroid, it belongs to the Arum family (Araceae), a large, mostly tropical family that consists of over 3,000 species. Several are familiar house or garden plants, such as calla lily, caladium, philodendron, pothos, and anthurium. Indiana relatives include arrow arum (*Peltandra virginica*), calla lily (*Calla palustris*), duckweed species (family Lemnaceae), skunk cabbage (*Symplocarpus foetidus*), and Jack-in-the-pulpit's closest Indiana relative, green dragon (*A. dracontium*).

The flowering apparatus of our plant of the year is most interesting, consisting of a tube (spathe, or "pulpit") within which is a club-shaped structure (spadix, or "Jack") where the plant's rudimentary flowers are attached. The flowers may be only male, only female, or sometimes a mix of each. Amazingly, on any individual plant this can change from year to year! The sexual expression appears to be based on the plant's age and vigor, with those bearing only female flowers usually the oldest and most vigorous.

Fungus gnats are the most common pollinators of Jack-in-the-pulpit. Perhaps attracted to a scent, gnats enter the spathe in search of fungus upon which to lay eggs. Finding none, they attempt to vacate the spathe but most (all?) are unable to

fly or crawl out. They can exit, however, through a gap at the base of the spathe, but only plants with male flowers have the gap. Since no such opening exists in plants with female only flowers, the gnats there are unable to escape and ultimately perish. Nonetheless, they still may have deposited pollen that was previously collected from male-flowering plants. Pollination and subsequent fertilization bring about bright, shiny red clusters of berries that in autumn put on quite a colorful show.

When you're out on a hike be sure to stop and admire one of Indiana's most amazing forest plants.

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Gracie, Carol. Jack-in-the-pulpit: Pollination by Deception. <https://www.nybg.org/blogs/plant-talk/2013/06/science/jack-in-the-pulpit-pollination-by-deception/>

Suetsugu, Kenji. *Arisaema*: Pollination by lethal attraction. <https://nph.onlinelibrary.wiley.com/doi/full/10.1002/ppp3.10261>

Michael Homoya, a frequent contributor to the *INPS Journal*, organizes the INPS Native Plant of the Year effort.



P. Rothrock

The fleshy, spike-like inflorescence of Jack-in-the-pulpit is surrounded by a large bract, the spathe. This photo shows a female plant since it lacks a gap at the base of the spathe.

Book Review: *Ecoblitz:* *An Indiana Forest Expedition* by the Indiana Forest Alliance

Reviewed by Eric B. Knox

This book by the Indiana Forest Alliance (2024, Indiana University Press) reports on a remarkable three-year census of the biodiversity found within the BackCountry Area of Morgan-Monroe and Yellowwood State Forests. As John Bacone notes in the Forward, biotic inventories provide essential baseline information for conservation action as climate change accelerates. There is an urgent need for similar efforts in other natural areas around Indiana and beyond.

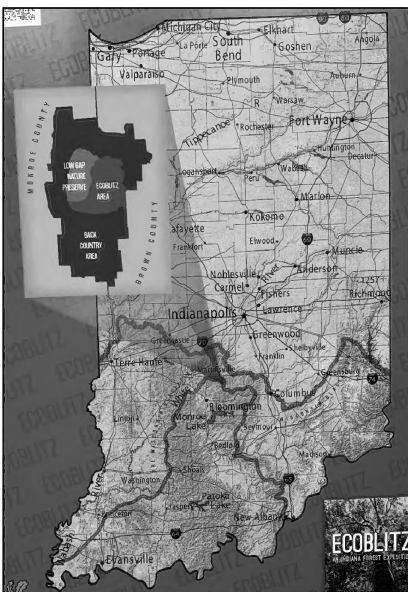
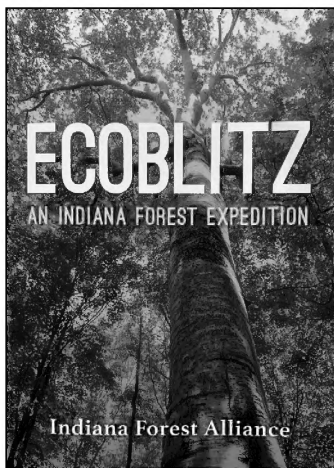
The donors, partner organizations, and individuals who worked on the “ecoblitz” and production of this book are legion, with Anne Laker and Emma Steele coordinating and preparing much of the text. The chapters are organized around five themes (Forest as Superorganism, Complex Cooperators, Forest as Haven, Insect Multitudes, and Forest as Spectacle), with profiles of individuals, essays, and Question and Answer interviews. The text is beautifully illustrated with color photographs of the forest, its plant, animal, and fungal inhabitants, and many of the people who made this effort successful. The scientific findings are presented in Appendix 1, which comprises a 59-page listing (in fine print) of the trees, herbaceous plants, mosses and liverworts, fungi, lichens, birds, bats, insects, bees, moths, butterflies, amphibians and reptiles, spiders, aquatic insects, fish, and mammals (in that order) that were documented during the ecoblitz. Appendix 2 lists the ecoblitz participants and answers the ‘Who ya gonna call?’ question concerning Indiana’s biodiversity.

This book comes at a time when human activity causes dramatic changes in

the natural world within a single human generation. While growing up in the Midwest of the 1960s, I remember the metronomic sound of windshield wipers during a sunset drive on a clear evening because flying insects were abundant, and the wiper fluid was essential for maintaining visibility. A Tanzanian woman once shared with me her belief that human progress is primarily driven by efforts to get away from bugs. “Well, I don’t really like bugs” is a not infrequent response to my childhood reminiscence of the previous insect abundance. And it is true that I try to avoid ticks and mosquitoes because of the diseases they might carry. Unfortunately, our efforts to ‘sanitize’ our urban and agricultural areas have been remarkably successful. Biodiversity loss has been incremental but the consequences now cascade. We are losing species that are important pollinators or players in complex food webs in ways that we do not yet understand. And these facts make the preservation of old growth forests and other high quality natural areas, such as the BackCountry Area, that much more important. The chapters of this book highlight the biotic treasures, and people with specialized knowledge and insight of our shared natural inheritance.

State Forests have a different status than State Parks. To some people, a fallen tree represents wasted timber if not harvested. Other people understand that ecological processes involve complex interactions, and a downed tree will support a myriad of new life for decades to come. This book is an important contribution to the latter viewpoint – the conservation effort in Indiana. Whether you are a plant devotee who wants to learn more about biodiversity, or a writer or artist who takes inspiration from nature, the text and photographs provide uplifting, informative, and entertaining illumination of an amazing forest and the people working to preserve it.

Eric Knox, a member of the South Central Chapter of INPS, is retired from Indiana University, where he was Director and Curator of the IU Herbarium.



A map of Indiana and the BackCountry Area (BCA) that is part of Morgan-Monroe and Yellowwood State Forests.

Courtesy of the Indiana Forest Alliance

Making More Room for Northern Harriers

By Nate Simons

"They fly low over the marshes and prairies soaring with their wings in a dihedral or V-shaped form ... their white rump patch very conspicuous. As they bank and soar and dive, their senses of sight and sound are keen for their prey. Chief among their prey are voles and mice." https://www.allaboutbirds.org/guide/Northern_Harrier/id

Once common in Indiana, the northern harrier or marsh hawk (*Circus hudsonius*) is now listed as "state endangered." The reason for this listing is that the bird of prey is nearing extirpation due to loss of habitat. Harriers are true grassland birds. They nest on the ground among native graminoids in prairies and marshes. To live, roam, and raise their offspring, they need large, open spaces devoid of much brush and trees with an abundance of native grasses, sedges, bulrushes, and forbs.

Pigeon River Fish and Wildlife Area in LaGrange County, Indiana boasts 12,000 acres of protected land managed for hunting opportunities. Much of the land was farmed prior to the early 1950's. The power of the Pigeon River was harnessed earlier. Three dams were built to provide grain milling and hydroelectric generation. The sandy lands and the peatlands of the Pigeon River valley turned out to be marginal at best for productive agriculture. When the hydroelectric dams were decommissioned, the State of Indiana bought the dams and the land and converted the area to wildlife habitat. Much was planted by staff of Pigeon River Fish and Wildlife Area following the guidelines of that era. Rows and strips of non-native conifers, autumn olive (*Elaeagnus umbellata*), Asian bush honeysuckle (*Lonicera* spp.), and annual grain fields were designed to create ample edge conditions and habitat for game animals. Tenant farmers were contracted to plant corn and soybeans annually with a requirement to leave a few rows unharvested as food for game.

Amid all the land conversion, a few high-quality natural areas remained. The remnant prairie fens of the valley were dedicated as state nature preserves, one of which, Mongoquinong Nature Preserve, lies north of the old Nasby millpond and dam.

Mongoquinong preserve, owned by Indiana Department of Natural Resources, Division of Fish and Wildlife (DFW) and managed by Division of

Nature Preserves (DNP), is the largest prairie fen complex in Indiana. It is home to seven state-listed avian species, 30 state-listed insect species, 36 state-listed plant species, 7 new (2022) state distribution records for spiders, and 1 state-listed and 1 federally-listed herpetofauna.

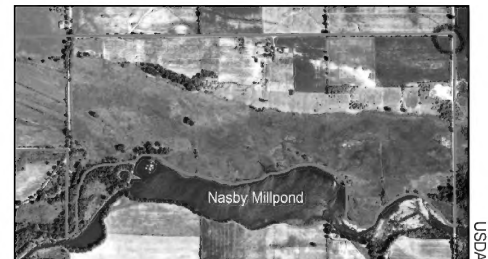
Mongoquinong Nature Preserve includes 65 acres of high-quality prairie fen wetland. The adjoining 19-acre slope known as Nasby Overlook Prairie was restored to prairie and oak barrens by Blue Heron Ministries about 15 years ago through various grants and partnerships.

Invasive plant species pressure from adjacent uplands and wetlands threatens the fen and prairie. With the cessation of tenant farming, the adjacent uplands (abandoned fields and fencerows) have become invaded by non-native herbaceous and woody species. An abandoned gravel pit is colonized with invasive brush and tree species. The adjacent peatland wetlands west of the fen are partially drained by excavated drainage ditches resulting in depressed groundwater levels and the conversion of a diverse sedge meadow community to a near monoculture of reed canary grass (*Phalaris arundinacea*).

Blue Heron Ministries, in partnership with Pigeon River Fish and Wildlife Area and the DNP, saw a significant restoration opportunity. Early in 2023, we applied for a Sustain Our Great Lakes (SOGL) grant through the National Fish and Wildlife Foundation (NFWF). The proposal sought to control invasive species and replace them with native, upland and wetland grassland species within Mongoquinong preserve, the Overlook Prairie, and the adjacent wetlands and uplands.

Although improving native plant communities is a good enough project, the proposal needed a hook to "catch the eye" of the grant makers. A phone conversation with NFWF staff revealed that the Foundation likes birds. Well, Mongoquinong has a long list of state-listed avian species: sedge meadow grassland birds (state endangered

1951 aerial image with Mongoquinong preserve outlined in red. Note the relative lack of trees and brush in the fen wetland just north of and west of the Nasby Millpond.



2022 aerial photograph showing the area north of Nasby Millpond. Note the loss of prairie land due to 70 years of tree and shrub invasion.

Harriers — continued on page 5

Morgan-Monroe BackCountry: Through the Lens of

By Paul Rothrock

Have you ever studied the Indiana landscape from the vantage point of a jet descending into the Indianapolis airport? My usual experience is seeing large expanses of agricultural fields that give way to suburban sprawl as you approach the runway. To my surprise, on a recent flight I spotted verdant forest blocks. We were approaching the airport from the south, coming in over Brown, Monroe, and Owen counties. This area, although close to Indianapolis, is home to some of Indiana's largest remaining expanses of National and State Forests.

From my airplane window, if I concentrate, I can recognize some tree species by their location on the landscape and subtle differences in color or shape. Of course, once on the ground, standing in those public forests, the trees readily provide information about which species dominate the forest, their age, and the value of the timber. However, to see the forest only for its trees, whether from air or on the ground, is to miss a myriad of plant life in this ecosystem. And if one is concerned about forest conservation or about the success of forest management broadly defined, then one should "ask" the entire plant community how it is doing. Floristic Quality Assessment (FQA) provides one approach to measuring the community's vibrancy. It does not merely focus on the trees but, in essence, allows each plant species to lend its "voice" to a scientific evaluation of the forest community.

Recently I had occasion to apply FQA to two forested areas in the vicinity of Bloomington and Nashville, Indiana. It led to a surprise. With the aid of a team of botanists, we had surveyed a portion of the BackCountry Area of Morgan-Monroe State Forest (BCA-MM). In particular, we studied a tract situated between Low Gap Road on the west and Possum Trot Road on the east, an area that for much of a century has had an opportunity to regain its historic structure and diversity. By the way, in the book *Ecoblitz* (IFA 2024), you can read about the larger effort to evaluate the biodiversity of this area and efforts by the Indiana Forest Alliance to bring its importance to the attention of the public and those charged with managing our public lands.

Subsequently the team turned its attention to the Combs Creek (CC) watershed in the southwest

corner of Brown County just south of Nebo Ridge. This rugged hill country, like BCA-MM, has remained rather untouched for a protracted period. Even though both areas are approximately the same size and have had time to return to historic condition, FQA revealed a remarkable difference between these two.

FQA has two foundational concepts.

FQA recognizes that some species are limited in their ability to tolerate human impact. These are referred to as conservative species. Other species may not only tolerate human impact but even thrive under these conditions. Thus, it is possible for experts who have seen plants in a wide range of conditions to assign each species a numerical value that estimates its tolerance to human impact. This number is referred to as a C value or a coefficient of conservatism. The C values for each Indiana species may be viewed at universalfqa.org. In this database, the most conservative species have values in the C = 7-10 range. The glade fern (*Homalosorus pycnocarpus*), for example, has a C = 9. Highly tolerant species, such as tall goldenrod (*Solidago altissima*), have coefficients of conservatism in the 0 to 3 range. Obviously, there is an intermediate range for those perceived to be C = 4 to 6 in their tolerance of human impact.

After one conducts an inventory of the species occurring in an area, you could ask what is their average C value? The mean C for Indiana forests seems to have a maximum of nearly 5. In contrast, if the forest has experienced degradation, perhaps by allowing grazing of livestock or overpopulation of white-tailed deer, the mean C value may fall as low as 3. And as one might expect, formerly cultivated land, after several decades of recovery, might have a mean C = 2.

Returning to BCA-MM and CC, it was not surprising that both had a high mean C, with C = 4.5 and 4.7, respectively. This suggests that both have retained or have returned to a condition that experts associate with remnant natural conditions, i.e., a community with low human impact.

Unexpected Species Richness

A second factor useful in assessing floristic quality, or the condition of a plant community, is to evaluate the number of species present, also known as species richness. By this measure, BCA-MM shines, having over 390 species compared to only 231 in CC. Equally important, of the approximately



P. Rothrock



High coefficients of conservatism indicate that yellow lady's-slipper orchid (*Cypripedium parviflorum*; C = 10) and glade fern (*Homalosorus pycnocarpus*; C = 9) are sensitive to human impact. Both species grow in BCA-MM. Note, however, that not all orchids or ferns have high C values.

Floristic Quality Assessment

160 species observed in BCA-MM but missing from CC, 44 species have high C values. These observations suggest that BCA-MM represents a biodiversity hotspot.

Both BCA-MM and CC fall within what Homoya et al. (1985) refer to as the Highland Rim Natural Region. Much of the area, which lies east of the Mt. Carmel fault, is underlain by siltstone, fine-grained sandstone, and shale bedrock. The soils derived from these parent materials tend to be acidic and of moderate fertility. So why the large difference in species diversity when comparing these two sites? Might the small amounts of limestone or limestone-derived glacial till differ between the two sites? Perhaps. As I study the soil maps of the two I think the answer lies more in the greater presence of deep soils, especially in areas associated with Honey Creek and its tributaries. It is noteworthy that the CC site has more channery in the soils, i.e., the soil contains numerous flat fragments derived from fractured bedrock strata.

Several other nature preserves in Brown County also display a noticeably lower richness of species. For example, data available for The Nature Conservancy's Hitz-Rhodehamel Preserve north of Nashville reveals a high mean C (4.5), but only 295 species have been recorded. Within the overall state, I am aware of only one other preserve, Yellow Birch Ravine Nature Preserve in Crawford County, whose floristic quality is a match to BCA-MM. Of course, maybe if we really looked deeply at the forests across Indiana through the FQA lens, rather than a "fly-over view," we would see them differently.

When I fly into Indiana and absorb the degree to which the landscape has been modified, I worry about preserving the floristic quality that lies beneath the forest cover of BCA-MM. Given its location, just a short drive from a major population center, will this amazing beauty, similar to that of historic Indiana, be compromised by overuse? What impact will economic demands put upon this and other forests in the public domain? And even with best intentions, what is the best management strategy for retaining the high floristic quality of BCA-MM? Ponder these questions on your next descent into Indianapolis.

Reference

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Paul Rothrock, a member of the South Central Chapter of INPS, makes frequent trips between Bloomington, Indiana and Bellevue, Washington.

Harriers — continued from page 3

sedge wren [*Cistothorus stellaris*] and marsh wren [*Cistothorus palustris*], secretive marsh birds (state endangered least and American bitterns [*Ixobrychus exilis* and *Botaurus lentiginosus*], and Virginia and sora rail [*Rallus limicola* and *Porzana carolina*]), and the state endangered grassland bird, our northern harrier. Due to its need for large expanses of contiguous native grassland habitat, this hawk became the icon species for the proposal that would effectively restore 235 contiguous acres of native grassland habitat. The grant application was successful!

The grant funds management of the original project area consisting of 84 acres and restoration of 151 acres of degraded adjacent wetlands, prairie, and declining oak savanna. The work, involving three partners and two private contractors, began in January 2024 and continues for three years. Invasive species will be controlled. Brushy fencerows filled with invasive shrubs and trees will be removed. White, black, and bur oak trees (*Quercus* spp.) will be protected. Nearly a mile of excavated drainage ditches will be filled to restore groundwater hydrology. At least 51 acres of former agricultural old fields will be converted to native prairie-oak savanna, and at least 57 acres of reed canary grass fields will be converted to native wet prairie, sedge meadow, and shallow marsh. Hundreds of pounds of native prairie seed will be collected and sown. And the entire grassland continuum will be maintained with frequent fire.

The hope is that this kind of stewardship will allow the northern harrier to flourish in its expanded home in the Pigeon River valley.

Nate Simons resides in Steuben County, Indiana and serves as Director of Blue Heron Ministries, a Christian land conservation organization. This article originally appeared in the Blue Heron newsletter.

*The east margin of Mongoquinong fen supports a tough-rooted stand of steeplebush (*Spiraea tomentosa*), a shrubby and showy member of the rose family.*



P. Rothrock



*Seemingly delicate plants such as this sticky false-asphodel (*Triantha glutinosa*) and diminutive members of the sedge family such as needle beak-sedge (*Rhynchospora capillacea*) and low nut-rush (*Scleria verticillata*) grow in the moist open areas of the Mongoquinong fen.*

Bringing Back the

By Karl Schneider

There's an old holiday tradition in the U.S. that's become harder to celebrate: fire-roasted chestnuts. Thanks to a fungus from east Asia (*Cryphonectria parasitica*), about 4 billion American chestnut (*Castanea dentata*) trees were killed off within 40 years beginning in 1904. The loss of so many trees not only affected the ecosystems they grew in, but the flourishing timber industry, too. So, what is being done in Indiana to bring back American chestnuts?

I spoke with an expert at Purdue University and The American Chestnut Foundation to bring you some answers.

Short Answer: Crossbreeding with trees from overseas.

The fungus that wiped out American chestnuts isn't going away. Other hardwood trees still host the fungus, though they are more resistant than the chestnuts were and don't die off. But this means that if the American chestnuts are ever able to make a recovery, they'll need to gain those same resistances.

Caleb Kell, an operational tree breeder at Purdue University, is part of a small team working to get the American chestnut off the ground again.

The main thrust of the research is crossbreeding the Chinese chestnut (*Castanea mollissima*) with the American species. The Chinese chestnut is resistant to the blight but doesn't have the same physical characteristics of the American species. Old American chestnuts fruit each year, and Kell said they were so prolific that people could walk into the forests and be ankle-deep in fallen chestnuts. Also, "While the American chestnut is a tall and straight growing tree, the Chinese chestnut is bushier," Kell said. It grows more like an apple tree, so it is not as good a timber tree and doesn't compete

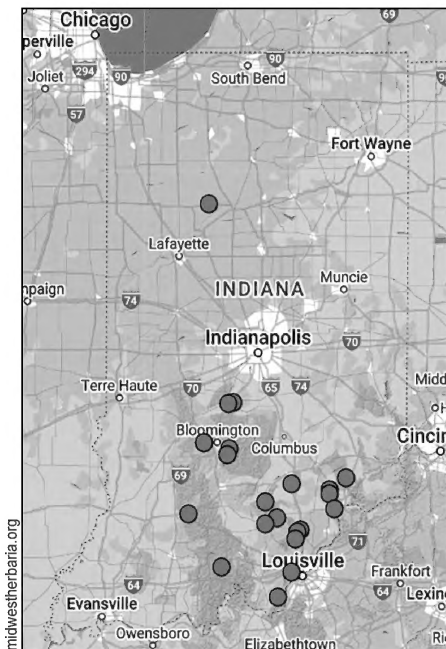
very well in the woods where young forests are regenerating." The goal, he said, is to get as close to the original American chestnut genetics as possible. Researchers would like to see the genetics be made up of one-sixteenth Chinese chestnut and the other fifteen-sixteenths American chestnut.

Long Answer: Wheat fields may hold the key to resistance.

Kell and his colleagues at Purdue are working with The American Chestnut Foundation to solve the blight problem. The national organization has created hundreds of chestnut trees with varying genetics but all nearly identical to the wild American chestnut. The initial crossbreed between an American and Chinese chestnut is dubbed F1, Kell said. That tree, which is half American chestnut and half Chinese chestnut, is then put through a process called backcrossing. Basically, F1 is crossed to American chestnut multiple times to whittle the genetics down to that 15/16th ratio.

The experts have not only used Chinese chestnuts for crossbreeding but have used some genes from wheat as a kind of vaccine for the newly minted American chestnut. Kell explained that the wheat *OxO* gene produces an oxalate oxidase enzyme. If successfully expressed in a transgenic line, this enzyme could eliminate one of the ways the chestnut blight fungus kills the cells in the American chestnut tree. The idea is that these pairings will combine and give the American chestnut the robust resistance it needs in order to be successfully reintroduced to hardwood forests, Kell said.

Successful reintroduction will not only provide an abundant food source for wildlife, but the timber harvested from American chestnuts is rot resistant and very strong. American chestnuts are quick growers in the hardwood world, too. One can reach timbering age by 25 years, a much shorter period than the 60 or so years for black walnut or nearly 100 years for white oak. "Having such a high-quality timber tree I think would lend very, very well to improving the



Historically, the American chestnut was a part of forests in southern Indiana's hills.

The record from White County in northern Indiana occurred not far from a tree nursery.

American Chestnut Tree

economic wellbeing of the timber producing regions of Indiana,” Kell said.

Kell and the researchers across the country hope to nail down this mix of genetics soon and begin reintroduction efforts.

Karl Schneider is an IndyStar environment reporter. You can reach him at karl.schneider@indystar.com. Karl's article first appeared in various Indiana newspapers in late 2023 and is reused here by permission of the author and IndyStar. IndyStar's environmental reporting project is made possible through the generous support of the nonprofit Nina Mason Pulliam Charitable Trust.

Editor's Update: The Disappointment and Other Approaches

When the story was written a year ago, there was optimism that a resistant form of American chestnut was nearly ready for release. But breeding trees and inserting novel genes is complicated and difficult work. In December 2023 the American Chestnut Foundation withdrew their support of this transgenic D58/D54 line after reviews indicated several problems (see <https://taf.org/darling-58/> for details). Data from multiple orchard locations (the orchards include the Purdue University site) indicated inconsistent blight resistance, negative impact on growth, and decreased survival rates. Although this transgenic line does not fit the needs of the American Chestnut Foundation, it can still represent a step forward and provide a line of commercial value. Meanwhile the American Chestnut Foundation continues to make gains in blight resistance with its traditional breeding program. It is working with partners on developing a rapid genotyping method to better predict blight resistance in hybrid lines. Likewise, the insertion of the OxO gene holds promise, especially by focusing on genes that regulate OxO expression.

And then there is yet another approach to restoring this premier forest tree to its former glory. Michael Homoya, our retired botanist/plant ecologist with the Indiana Department

of Natural Resources, observed that there is a separate organization known as the American Chestnut Cooperators Foundation whose focus is to restore the American chestnut without incorporating the genes of Chinese chestnut. They have been seeking out native American chestnuts that show some resistance to the chestnut blight and selectively breeding them with the hope of developing a truly pure American chestnut. As stated on their website (<https://accf-online.org/>), “Decades of selective breeding have yielded our orchards full of American chestnuts with improved resistance levels.” “American chestnuts have potential to once again fill forest canopy space.”

Regardless of the approach, each organization believes that there are good reasons to consider planting a few trees raised from wild Indiana seed. Visit <https://www.treepro.com/> for more information.



The delicious nuts of American chestnut, which fed generations of indigenous Americans, develop in a prickly involucre. Now these nuts are seldom seen in the forests of eastern North America.



Bill Deeter

There are numerous differences between this Chinese chestnut and our North American species. The leaves of the Asian species are less elongated, less sharply toothed, and have fuzzy lower surfaces. Also notice that this tree has multiple trunks and thus does not make a good timber tree.



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To promote the appreciation, preservation, scientific study, and use of plants native to Indiana.

To teach people about their beauty, diversity, and importance to our environment.

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We thank the many sponsors who helped support the INPS annual conference and made it a success. Here are the five designated as Bur Oak Level sponsors.



Butler University

Butler University partnered with INPS in a replanting of the historic Holcomb Gardens. This new generation of garden makes intensive use of plants native to Indiana and encourages a more ecologically sound landscape.



Central Indiana Land Trust

For over 30 years, the Central Indiana Land Trust (CILTI) has preserved the best of Central Indiana's natural areas, protecting plants and animals, so Hoosiers can experience the wonder of the state's natural heritage (<https://conservingindiana.org/>). The recently acquired Fern Station made news with the discovery of the rare weft fern (highlighted elsewhere in this issue of INPS Journal).



Eco Logic LLC

Eco Logic LLC is an ecological restoration and green infrastructure firm founded in Bloomington, Indiana in 1999 (<https://ecologicindiana.com/>). They focus on restoring natural areas and improving the sustainability of our urban environment, including bioswales, rain gardens, and pollinator habitat.




The Nature Conservancy

The Nature Conservancy of Indiana (TNC) has protected more than 100,000 acres in the state (<https://www.nature.org/en-us/about-us/where-we-work/united-states/indiana/>). Using science and collaboration, their human:nature campaign will have a profound impact on Indiana's future.




Plews, Shadley, Racher, & Braun Attorneys at Law

Plews, Shadley, Racher, & Braun Attorneys at Law was founded in 1988 as a different kind of law firm. They provide high quality, cost-effective legal work with creative, innovative solutions to their clients' complex matters (<https://www.psrb.com/>). They are committed to helping businesses, large and small, thrive. 

Get ready for Florathon 2025!

Florathon 2025 runs from April 1 through May 31.

Get your team together now and start planning: give yourselves a name, solicit sponsors, and plan your route through Indiana's natural areas to spot flowers in bloom!

Donations go to Letha's Youth Outdoors Fund, whose aim is to engage children with nature. 

INPS Biodiversity Grants

By Molly Baughman

Each year INPS awards small grants for research, demonstration gardens, and land management and conservation projects. Here are two awardees who recently completed their grant activity.

1. **Friends of Brown County State Park** was awarded \$1,300 for their Native Indiana Teaching Garden project. This demonstration garden is designed to educate people on what native plants to buy instead of non-native plants. INPS funds were used to purchase the native plants, signage, topsoil, mulch, and a shrub. Plants include prairie dropseed (*Sporobolus heterolepis*), aromatic aster (*Symphyotrichum oblongifolium*), butterfly milkweed (*Asclepias tuberosa*), Canada anemone (*Anemone canadensis*), tall coreopsis (*Coreopsis tripteris*), bee balm (*Monarda fistulosa*), wild geranium (*Geranium maculatum*), royal catchfly (*Silene regia*), and a red chokeberry shrub (*Aronia arbutifolia*). This garden, adjacent to the Nature Center, was planted in an Interpretive Garden that is fenced to keep out deer.

Plant Chokeberry NOT Burning Bush	Plant Aromatic Aster NOT Chrysanthemum
Plant Bergamot NOT Oriental Poppy	Plant Prairie Dropseed NOT Maiden Grass/Miscanthus
Plant Royal Catchfly NOT Painted Daisy	Plant Tall Coreopsis NOT Hollyhocks
Plant Butterfly Weed NOT Orange Daylilies	This garden made possible by a grant from the Indiana Native Plant Society

Left:

Demonstration gardens provide an opportunity to tell the story that plant selection matters. The point may be driven home by a "plant this not that" sign.

Right:

Success! Butterfly milkweed serviced a zebra swallowtail pollinator.

Below:

Views of the newly renovated demonstration garden.



Friends of Brown County State Park



2. **Winchester Community High School Earth Club** (WCHS-Earth Club) was awarded \$1,400 for their Native Demonstration Garden project. INPS funds were used to convert an existing grassy area at the high school into a native demonstration garden. The project will further the Earth Club's mission to raise awareness about environmental health, to encourage sustainability in their community, and to foster an appreciation for nature.

WCHS-Earth Club used INPS funds to purchase 287 plants including round-leaved dogwood (*Cornus rugosa*), Virginia waterleaf (*Hydrophyllum virginianum*), little bluestem (*Schizachyrium scoparium*), hairy beardtongue (*Penstemon hirsutus*), purple coneflower (*Echinacea purpurea*), butterfly milkweed (*Asclepias tuberosa*), tall coreopsis (*Coreopsis tripteris*), palm sedge and eastern star sedge (*Carex muskingumensis* and *C. radiata*), maidenhair fern (*Adiantum pedatum*), sweet Joe Pye weed (*Eutrochium purpureum*), orange coneflower (*Rudbeckia fulgida*), and tall bellflower (*Campanulastrum americanum*). Wild violets (*Viola* sp.) present in the area were saved to provide native groundcover. An additional grant provided by a local recycling district was used to purchase a bench, a bird bath, a platform bird feeder, and mulch. A poster was made to hang inside the school near the window overlooking the garden describing the project, including thanks to the INPS and the Randolph Recycling District for funding.

Molly Baughman, a member of INPS Central Chapter, chairs the Biodiversity Grants Committee.



Winchester Community High School Earth Club



Top: A portion of the beautifully designed WCHS demonstration garden that harbors more shade-tolerant species.

Bottom: Members of the WCHS-Earth Club garden planting team.

WTHR News Flash: A Rare Fern Discovered in Indiana Forest

The Winter 2023-2024 issue of the INPS Journal highlighted three native fern species that occupy a twilight zone between light and shadow. Among these is the weft fern (*Crepidomanes intricatum*), a state-endangered species that grows on rocks, caves, and sheltered crevices. According to October 1, 2024 reporting by WTHR, a new locality for this curious species was found during a plant inventory at Fern Station in Putnam County.

The preserve, a 570-acre forest located west of Greencastle, was purchased in 2023 by the Central Indiana Land Trust (CILTI). The fern was discovered during several days of plant survey by Indiana Department of Natural Resources botanist Scott Namestnik and ecologist Wyatt Williams, accompanied by CILTI's stewardship director Jamison Hutchins.

As reported by WTHR, "We knew we would see a wide variety of ferns because they thrive in lush, wooded ravines," Hutchins said. "But weft fern was unexpected. It was a very cool find."

Cliff Chapman, president of CILTI, said the discovery of the weft fern in the preserve shows "the area has been undisturbed for hundreds, if not thousands, of years."

According to the CILTI website, Fern Station is a stunning unbroken forest, the largest piece of land they have ever protected. It offers unparalleled forest interior habitat for wildlife. At this time, while developing a comprehensive management plan, Fern Station is only open for guided hikes and events hosted by CILTI and its partners.



Joe Cox's Trees Live On

By Paul Rothrock

Part 2

Joe Cox as pictured in a 1941 issue of the Louisville Courier Journal.



Joe Cox's Woods, today known as Pioneer Mothers' Memorial Forest, exists because of the personality of a little recognized environmental hero who died in December 1940. By serendipity I came across a recounting of his story in an article from "The Saturday Evening Post" by Andrew H. Hepburn, from January 31, 1942. The clipping, saved by Charles Deam, lay hidden in the files of the Indiana University Herbarium for the past 75 years.

Part 1 of this story, in the fall issue of *INPS Journal*, gave a hint at the unexpected, miraculous ending to Joe Cox's story. This excerpt from the Post article, gives clues as to what motivated Joe's remarkable behavior, where his love of trees far outstripped the opportunity for financial reward. How many of us could follow his example?

"When the [Cox] family migrated from Tennessee, the Ohio Valley was a land clothed in a mature forest — not a forest of conifers common to mountain slopes and uplands all over the world, but oak, walnut, maple, poplar, ash, beech, hickory, locust, and dozens of other species. It was a forest peculiar to the Ohio Valley. Nowhere else were there hardwood trees in such a variety of species, and nowhere else did they grow to such great size

[Joe Cox's grandfather, Joseph Cox] had the pick of the land and chose a forest ridge, running north and south. He selected a valley beside the ridge, with a clear small stream running through. It would be fine land to clear, and a sheltered spot for a cabin

[Grandfather] Joseph Cox not only loved his forest land but he had a practical appreciation of its proper use. From trees cut along the valley floor he made things. There was a

workshop lean-to on the log barn and in it a lathe and woodworking tools. On a certain porch in Paoli today you can see a black-walnut rocking

cradle which Grandfather Joseph made specially for the twins, Joseph and Jesse. In a dining room in Paoli you can find an imposing cherry-wood highboy, product of Joseph's craftsmanship.

The forest was a fine place, too, for fattening of hogs. They grew sleek on the fallen acorns, on beech and hickory nuts

William Cox succeeded to the guardianship of the Cox forest He added some land for farming purposes but kept the forest tract intact. For a time he operated a small sawmill to cut the logs of his neighbors, not his own

Elizabeth Cox, the wife of William, was forty-two years old when her husband died [Like her husband] she had a real reverence for the forest that reared its leafy heights before her door In her last born, Joseph, the mother's love of trees flowered into a passionate devotion verging on fanaticism. Joseph was to see all the forests about him except his own destroyed to satisfy the demand of an expanding industry. And Joseph was to resist, with a hostility that many of his neighbors called queer.

To Joseph, the forest before his door was life itself. As a boy, his playtime was spent in it. He knew every tree, every squirrel nest.

When Joseph took over the family land, around 1880, the cycle of forest destruction was approaching its peak. Farmers found that they could make a great deal more money selling timber from their hills than by growing corn in the valleys

By the turn of the [twentieth] century the pattern of Joseph's life had set. He called himself a farmer, but actually his farm along the valley floor was but a means of existence. He was really a forester. He spent long hours wandering through it. He had favorite places where he would sit by the day, bemused by the magic of it.

People began to think him a little odd. He was a quiet man, gentle, soft spoken. He attended the Methodist Church regularly, but his truest religion was his devotion to his trees

Then came World War I. Timber prices all over the land began to soar. Some types of timber were of a special value. Among these was black walnut. Timber scouts in remote cities heard that there was a great stand of black walnut untouched on a tract in Indiana. They came to Cox Woods. It was unbelievable — tremendous



P. Rothrock

Cox's woods continues to sustain beautiful, mature American beech (Fagus grandifolia). This specimen is amid a paw paw patch (Asimina triloba) and some younger sugar maples (Acer saccharum). Due to the shaded conditions unsuitable for sapling development, young oak (Quercus spp.) saplings are scarce in these woods.

Talking Trees

Excerpt from Gene Stratton-Porter's "A Girl of the Limberlost"

walnuts towering to 130 feet, huge of bole, straight as giant lances, the first limbs seventy feet above ground.

That was not all. There were other trees. Equally large, equally fine and almost as valuable, Hundreds of them. Joseph began to get offers the likes of which he had never heard before. This only made him angry.

The timber scouts persisted. If he wouldn't sell the whole tract, would he sell the walnuts? He would not! There was a special grove of them where he liked to sit and ponder by the hour

As [Joe aged] he needed more money than he could eke from the tiny farm Presently the creditors began to be persistent. They were his neighbors, and they understood him, but after all, money was scarce, and it wasn't as though Joe couldn't get it. Look at the trees. This led to the most bitter decision Joe ever made. He hated to be in debt. He had to have money. He would sell some trees. He sold two, not in the main forest but on the fringe of it, and not the best trees. He paid his small debts. What was left gave him cash enough for three years."

Despite Joe's unusual ways, his Paoli neighbors wanted to help the aging man. During the mid-1920's, friends dreamed of ways to have the forest purchased and preserved as some sort of sanctuary. Unfortunately, initial efforts to preserve the tract failed. The state had no money for forests, and private citizens seemed uninterested. The future of the forest at the time of Joe's death was much in jeopardy. Part 3 of this story will delve into the miraculous events that led to the preservation of Joe's trees. 🍁

— continued from right ←

"The music?"

"All other trees are harps in the winter. Their trunks are the frames, their branches the strings, the winds the musicians. When the air is cold and clear, the world very white, and the harp music swelling, then the talking trees tell the strengthening, uplifting things."

"You wonderful girl!" cried Ammon. "What a woman you will be!" 🍁

Elnora led the way and Ammon followed. The outlines of the room were not distinct, because many of the trees were gone, but Elnora showed how it had been as nearly as she could.

"The swamp is almost ruined now," she said. "The maples, walnuts, and cherries are all gone. The talking trees are the only things left worthwhile."

"The 'talking trees'! I don't understand," commented Ammon.

"No wonder!" laughed Elnora. "They are my discovery. You know all trees whisper and talk during the summer, but there are two that have so much to say they keep on the whole winter, when others are silent. The beeches and oaks so love to talk, they cling to their dead, dry leaves. In the winter the winds are stiffest and blow most, so these trees whisper, chatter, sob, laugh, and

at times roar until the sound is deafening. They never cease until new leaves come out in the spring to push off the old ones. I love to stand beneath them with my ear to the great trunks, interpreting what they say to fit my moods. The beeches branch low, and their leaves are small, so they only know common earthly things; but the oaks run straight above almost all other trees before they branch, their arms are mighty, their leaves large. They meet the winds that travel around the globe, and from them learn the big things."

Ammon studied the girl's face. "What do the beeches tell you, Elnora?" he asked gently.

"To be patient, to be unselfish, to do unto others as I would have them do to me."

"And the oaks?"

"They say 'be true,' 'live a clean life,' 'send your soul up here and let the winds of the world teach it what honour achieves.'"

"Wonderful secrets, those!" marveled Ammon. "Are they telling them now? Could I hear?"

"No. They are only gossiping now. This is play-time. They tell the big secrets to a white world, when the music inspires them."

— continued at left



P. Rothrock

A perfect day for hearing the talking beeches and oaks. This beech is whispering to be patient and unselfish.

January Surprises at Holliday Park

By Norma Wallman

January 9, 2014. I finished Naturalist Training, a class about waterways and water quality in Indianapolis. In a post-class chat, someone mentioned skunk cabbage. I thought, oh yes, I should check on that species (even though it had been raining and was still very damp). A little early for it to be in bloom but the spikes (i.e., the spathes) might be up. As I descended the 100 steps from high ground at Holliday Park down to near the edge of the White River, I noticed that hardly any green could be seen.

Almost everything was brown, from the beech leaves clinging to their twigs to nearly all other leaves lying on the ground. I remembered that I also needed to check on the lenten-rose (*Helleborus niger*). Not a native wildflower, but a flower I discovered roughly 20 years ago and whose early blooms I always enjoy. This January it had full buds but no open blossoms. I walked on to Trail 7, location of the earliest blooming skunk cabbage (*Symplocarpus foetidus*). I could find only one unopened spathe; not surprising since it wasn't even mid-January yet. I then decided to take Trail 8 to the main loop of Trail 6, just to check on the puttyroot (*Aplectrum hyemale*). Its green and white striped leaves would be visible and a contrast to the brown. Nice!

As I walked by one of the massive tulip poplar (*Liriodendron tulipifera*) trees I noticed bubbles on the bark and was puzzled but continued to walk. I walked up an incline where I noticed several kinds of mushrooms. I stopped at one, small and a light tan-orange in color with an open center. I'm not that familiar with mushrooms but I was curious. I picked up a stick and started tapping one, and then another, and another. Poof! Poof! Poof! Brown puffs – spores.

Were these mini puffball mushrooms (*Lycoperdon* sp.)? I was having fun and frustrated at the same time – I couldn't capture a photograph of the puff and tap simultaneously. Inexplicably at that moment I noticed numerous white "strings," lots of them, that brought to mind the book *Entangled Life* by Merlen Sheldrake. The white "strings" were mycelia, the communication networks of fungus. Why was I just seeing these for the first time?! Perhaps they were more exposed because of the recent rain? My brain had heard of it, recognized it? Cool!

Although it was starting to rain, I wasn't ready to leave. Back to the tulip tree. Yes, those bubbles really did look like soap – how could that be? Had someone sprayed dish soap on the tree? Was someone trying to remove graffiti? The bubbles seemed more numerous in the deep crevices. I was totally puzzled.

It was starting to rain pretty hard so I continued to walk, processing mycelia, puffing mushrooms, and bubbles on tree bark.

Once home I did a quick Google search: "bubbles on trees" and discovered a February 2023 Washington Post article by John Kelly. He spoke with Alison Pearce, deputy director for programs at *Nature Forward*. She said, "Basically, it is suds." Dust and particles settle on a tree, the tree secretes its own chemicals, and when it rains it all gets mixed together and worked into a froth. I also found a podcast on "Stemflow Mix" and one, "Outside/Inbox" by New Hampshire Public Radio, where nature interpreter Rebecca Roy explains this marvelous crude soap.

Wow! What a great day of discovery!
Norma Wallman, a member of the INPS Central Chapter, has published a guide on the plants of Holliday Park in Indianapolis, her favorite urban spot for communing with nature.



Puffball mushrooms can spout a cloud of brown spores through an opening on their top surface.



These strings are not strings. They are mycelia, the vegetative part of a fungus.



Natural "soap" suds form in the fissures of this tree bark.

Extinct — continued from back page

disturbances scattered across the continent every year, creating openings in the canopy of old growth forests. This pattern would have joined with the impact of fires on the landscape — two major influences in maintaining the natural landscape we inherited. Both of these influences would have benefitted oak.

Perhaps now you might be thinking — what proof can we see today that supports my speculations? Well, about 20 years ago, I stumbled onto something that got me interested in passenger pigeons. I was working for the Indiana DNR Division of Nature Preserves as a Regional Ecologist. One summer day one of my Ecologist Aides, Brian Lowry, called to say, “I found rattlesnake master growing along the road in Scott County.” Rattlesnake master (*Eryngium yuccifolium*) is best known from prairies, but in southern Indiana it inhabits glades and barrens.

Brian’s find didn’t make a lot of sense. There were no known barrens in Scott County, and this area was forested.

I had a planned trip to the Indianapolis office, so after my meetings were over, I went to the State Library. Using the microfiche machine to access archives, I scanned the General Land Office (GLO) surveyor notes. Today, these notes are available digitally, describing each section of the state. Our state was one of the first of our nation to be divided into 640-acre sections, or square miles, in the Township and Range system envisioned by Thomas Jefferson. Out in the field, one can still find cornerstones with hand carved markings in them, set by GLO surveyors.

Imagine how I must have jumped out of my seat reading the cursive writing from 1807: “No bearing tree could be marked for the want of timber, this ½ mile is over hilly knobby barrens... poor land, timber destroyed by the pigeons.” Then later, “All trees killed by the Pigeons,” and “Pigeon Roost.”

I wanted to keep searching, but the library was closing. It would take me a few more weeks to piece together that this area in Scott County covered over nine square miles. Brian Lowry and I carefully looked for plants in the area for several months along the road and created a list of barrens species that were still there 200 years later. These included rattlesnake master, purple coneflower (*Echinacea purpurea*), tall blazing star (*Liatris*

spicata), prairie dock (*Silphium terebinthinaceum*), big bluestem (*Andropogon gerardi*), little bluestem (*Schizachyrium scoparium*), Indian grass (*Sorghastrum nutans*), New Jersey tea (*Ceanothus americanus*), and more.

It was incredible to realize this barrens was maintained by pigeons. This site likely was only one of thousands where birds congregated for their migration. I have to believe that passenger pigeons, over time, helped maintain oak-hickory forests at a landscape scale across eastern North America. They did this through the disturbance of taking down trees and branches and selectively gobbling beech nuts by the billions.

And these billions of nuts turn into guano. There are historical reports that when thousands of birds would roost in one or two trees at a time, the guano left there would kill the tree they roosted in.

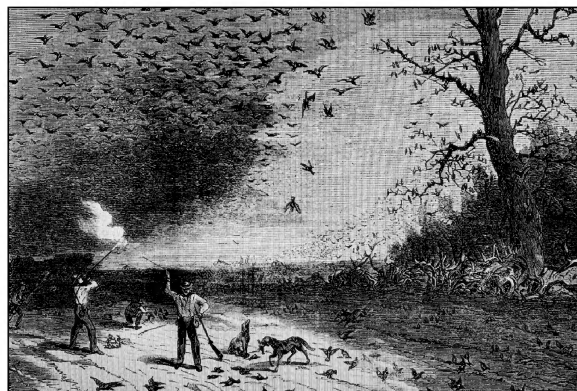
The disturbance that created light gaps and soil conditions from the guano left by migratory pigeons could have benefited other plants besides oaks. Likely other species that have undergone decline and even local extirpation, such as certain orchid species, may have been impacted by the loss of these birds.

Many serious threats to our forests are well known — invasive species, habitat fragmentation, and climate change. Is the loss of the passenger pigeon an overlooked impact? I plan to continue researching the role of *Ectopistes migratorius* in landscape ecology to inform how we might better manage our ecosystems in the future.

Cliff Chapman, a member of the INPS Central Chapter, serves as President & CEO of the Central Indiana Land Trust.

Suggested Resources

Greenberg, Joel. 2014. A Feathered River Across the Sky: The Passenger Pigeon's Flight to Extinction. Bloomsbury Publishing.
What Is Missing website — <https://www.whatismissing.org/timeline/passenger-pigeons-timeline>



Immense flocks of passenger pigeons in the neighborhood of Kingston, N. Y. (NY Times, April 28, 1872).

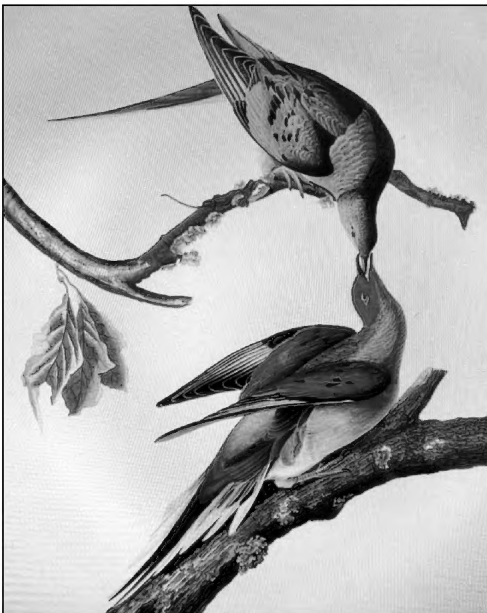


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Did an Extinct Species Shape Our Natural Landscapes?



By Cliff Chapman

Until relatively recently, the passenger pigeon (*Ectopistes migratorius*) was the most common bird in the world. Imagine a flock numbering in the millions flying in during early spring. By some accounts, the first migratory wave sounded like a tornado when they descended on the forest floor to chow down on tree nuts. Before their extinction in 1914, this species must have had an enormous impact on Indiana forests and those in much of the eastern United States.

Historical accounts wax hyperbolic, but we have eyewitness records in Indiana that tell an overlooked story. My hypothesis is that this incredible species was an important factor in shaping the plant communities that European explorers first set eyes on hundreds of years ago.

Passenger pigeons produced crop milk to feed their young, which were known as squabs. These flightless birds were left behind before they could take wing, and only by their sheer numbers did they outlast the predators that found the nesting colonies. This evolutionary trait did not prepare the species for hungry 19th century Americans and the Industrial Revolution, when people would knock these milk-fed young off branches by the thousands, eliminating the next generation. The most common bird in the world disappeared so quickly that scientists barely had time to study it.

Tree nuts, mostly beechnuts and acorns, were what the adult birds used to produce the crop milk that fattened the squabs. Pigeons preferred beech nuts to acorns. It's interesting to consider: when you take three billion birds that preferred eating beechnuts over acorns and remove those hungry mouths from an ecosystem, that system will quickly change as beech trees proliferate.

The depiction of a pair of passenger pigeons from Audubon's Birds of America, published in 1838.

There were many accounts of passenger pigeon flocks lighting onto trees during twice-yearly migration in numbers that would take down a tree. Peter Kalm, who studied under Linnaeus, wrote about an experience in 1749 while traveling in the colonies. "In this wilderness we could hear in the night time, during the calmest of the night caused tremendous reports: this might in all probability be ascribed to the Pigeons, which according to their custom loaded a tree down with their numbers to such an extent that it broke down."

This type of disturbance creates a light gap. Many studies indicate that oaks can only survive in the forest understory for ten years in the absence of a canopy gap. Maples, and other more shade-tolerant species, wait for up to forty years.

These stochastic or random events are of great interest to me. Considering that migratory routes probably didn't follow the exact same paths each year, and that these migrations occurred over thousands of years, there would have been thousands of small but important

Extinct — continued on page 15